

ABSTRACT

THESIS: Exploring the feasibility of passive cooling technology in the non-residential building sector over various climatic regions in the United States.

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AIM and INTENT:

The thesis presents a comprehensive overview of the context and significance of ventilation cooling techniques and their feasibility in the United States. Passive cooling is one of the more architecturally interesting ways by which architects could make buildings energy efficient. There is great interest in passive systems since they can lead to a huge reduction of energy costs and support more sustainable building solutions. A number of ventilation system options are available to fill the need for a lower cost alternative to active [conventional] systems. It is the non-residential sector where energy consumption is of most concern and integrating passive natural ventilation in new non-residential buildings is receiving a lot of attention internationally and the U.S. building industry. Interest in improving air quality by passive ventilation is also increasing.

METHODOLOGY:

This thesis explores the feasibility of passive cooling strategies in the U.S., with a focus on non-residential building types. A literature review has been developed as a part of the thesis. The thesis has been developed using multiple methods, including in particular case studies and interviews. The case studies correlate with the types of design strategies used and focus on the important aspects of these techniques. The ventilation strategies used in these case studies, drawn from different regions, have been explored. The research focuses on passive systems for cooling, but also touches upon indoor air quality. It also considers technical and social aspects related to passive cooling.

CHALLENGE:

The thesis is not to merely study of the passive techniques that could be incorporated in our day-to-day life but to question the applicability of these systems in various climatic regions in the United States. I am from a place where these techniques are used more as a norm than an option and it interests me to study their feasibility in climates and regions in the United States where they are simply not used very much. This is unfortunate since these passive cooling techniques can have immense impacts on the environment: improving air circulation, and air quality, improving energy standards, producing carbon emission reductions, and leading to better and more healthy ways of life.